# Database Design for the Evaluation of On-shore and Off-shore Storm Characteristics over East Central Florida

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Ground and ocean instrumentation locations


NASA/NOAA Buoy 41009 (20 nm off KSC coast) & 41010 (120 nm off KSC coast) instrumentation set-up


Campbell Scientific CS110 Electric Field Meter used on NASA Buoys 41009 and 41010


One of 31 Thunderstorm Technologies' Electric Field mills in the KSC ground network used for this study

- Database to The KSC Lightning Research Database (KLRD) was created to investigate lightning characteristics over differing terrain as well as reduce manual data entry time and combine information from various data sources into a single record for unique lightning events of interest.

- The KLRD contains data from over 170 unique storms (January – September 2014) and provides the following capabilities:
  - Imports data from a lightning detection network and identifies and records lighting events of interest.
  - Imports data from NASA Buoys 41009 and 41010 and the KSC Electric Field Mill network, then matches these electric field mill values to the corresponding lightning events.
  - Calculates distances between each lightning event and the various electric field mills.
  - Aids in identifying the location type for each stroke and provides statistics on the number of strokes per flash.
  - Allows for customized searches and reports.
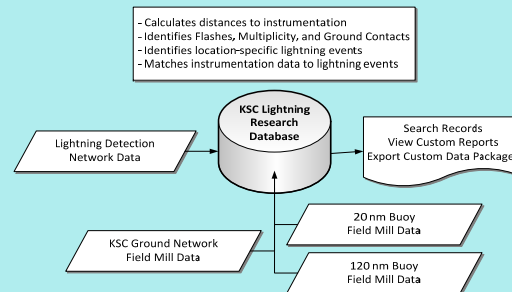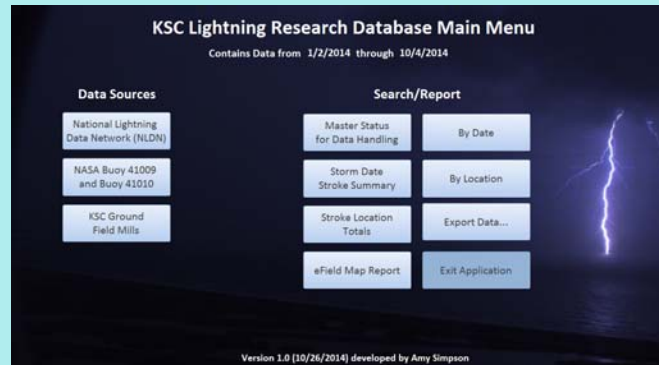




## Major Findings to Date

1. The largest positive and negative $I_p$ in the samples to date originate over the ocean.
2. Higher E-fields occur over ocean during active lightning as compared to on-shore E-fields using the same criteria.
3. No statistical difference was found for polarity by terrain.
4. No statistical difference was found for multiplicity by terrain.
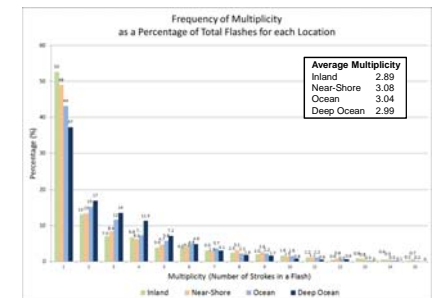

Jan-Sep 2014 lightning events selected by inland, near-shore, ocean, and deep ocean locations
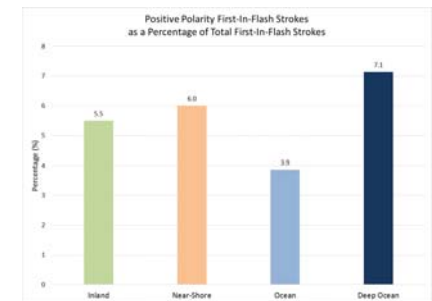

Polarity by location
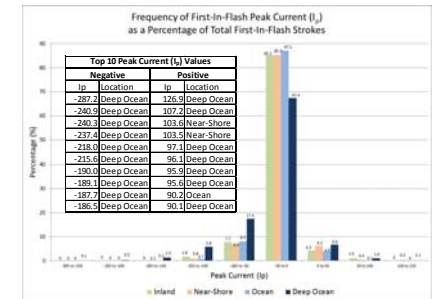

Peak current ($I_p$) by location


Multiplicity by location